## APPENDIX

Upon entry of the amendment herewith, the following claims are pending in the application:

1. A nucleic acid composition for muting expression of a gene in a population of animal cells, wherein the nucleic acid includes a sequence homologous to an endogenous sequence in the gene.

2. A nucleic acid composition according to claim 1, wherein the gene is carried on a chromosome of the cells.

3. A nucleic acid composition according to claim 1, wherein the population of cells is selected from the group consisting cells of a cancer, cells associated with an autoimmune condition, and cells having a gene of a pathogen.

4. A nucleic acid composition according to claim 3, wherein the pathogen is a virus.

5. A nucleic acid composition according to claim 1, wherein the nucleic acid is selected from the group consisting of a DNA, an RNA, and a nucleic acid analog.

6. A nucleic acid composition according to claim 5, wherein the nucleic acid analog is selected from the group consisting of a phosphorothioate, a 2′-*o*-methyl RNA, and a peptide nucleic acid.

7. A nucleic acid composition according to claim 1, wherein the nucleic acid is double stranded DNA.

8. A nucleic acid composition according to claim 1, wherein the animal is a vertebrate.

9. A nucleic acid composition according to claim 8, wherein the vertebrate is a warm-blooded animal.

10. A nucleic acid composition according to claim 9, wherein the warm-blooded animal is a mammal.

11. A method for muting expression of an endogenous gene in a population of animal cells, the method comprising the steps of:

(a) providing a muting nucleic acid; and

(b) delivering the muting nucleic acid into the cells.

12. A method according to claim 11, wherein providing the muting nucleic acid includes providing a nucleic acid composition having a transgene, the transgene having a sequence that is substantially homologous to a sequence in the endogenous gene.

13. A method according to claim 11, wherein the nucleic acid is selected from the group consisting of DNA, RNA, and a nucleic acid analog.

14. A method according to claim 13, wherein (a) further comprises the step of engineering the nucleic acid into a recombinant vector.

15. A method according to claim 14, wherein the recombinant vector is a plasmid, a phagemid, or a virus.

16. A method according to claim 15, wherein the vector is a preparation of double-stranded DNA plasmids.

17. A method according to claim 12, wherein the muting transgene sequence is substantially homologous to an endogenous sequence that extends to a portion of the endogenous

gene selected from at least one of the group of: the 5′ untranscribed portion, the transcribed coding and non-coding portions including exons and introns, the 3′ untranslated portion, the 3′ untranscribed portion, and a portion that overlaps adjacent ends of at least two portion of the endogenous gene.

18. A method according to claim 17, wherein the nucleic acid comprises a sequence that is substantially homologous to an endogenous sequence located in the 5′ portion of the endogenous gene.

19. A method according to claim 18, wherein the endogenous sequence located in the 5′ portion comprises about 200 to about 400 bases in length.

20. A method according to claim 18, wherein the endogenous sequence located in the 5′ portion comprises about 400 to about 600 bases in length.

21. A method according to claim 18, wherein the endogenous sequence located in the 5′ portion comprises about 600 to about 1,000 bases in length.

22. A method according to claim 11, wherein the muting nucleic acid comprises a sequence that is substantially homologous to an endogenous sequence located at the 3′ portion of the gene.

23. A method according to claim 22, wherein the 3′ portion of the gene includes an untranscribed portion and a portion that overlaps the 3′ end of the coding portion.

24. A method according to claim 11, wherein the step of delivering the muting nucleic acid in (b) is selected from the group of: transforming, transfecting, electroporating, infecting, and lipofecting the nucleic acid into the cells at a plasmid copy number which is a multiple of the number of cells to which the nucleic acid is delivered.

25. A method according to claim 24, wherein delivering the muting nucleic acid comprises infecting the cells with a genetically attenuated preparation of bacteria or viruses.

26. A method according to claim 16, wherein following (b), the copies of plasmids from the preparation that enter the cells are maintained in a substantially transient condition in a majority of the transformed cells.

27. A method according to claim 26, wherein the plasmids are transiently maintained in the cell.

50. A composition obtained by the method of claim 11 in a pharmaceutically acceptable carrier.

52. A composition obtained by the method of any of claims 25 and 26, in a pharmaceutically acceptable carrier.